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SPECIAL ARTICLE

SOVIET SCIENTIFIC AND TECHNICAL MANPOWER

The USSR is training a body of scientists and technicians which is increasing in size and quality and approaching comparability with that of the United States. If present trends continue, the total capabilities of Soviet scientific and technical manpower may exceed those of the United States in the near future.

The Soviet leaders have consistently regarded science and technology as the key to the attainment of their national economic and military goals and have developed nationwide programs for scientific and cultural education which have mobilized large human and material resources.

The vitality of the Soviet program of higher education is apparent in the growth in the number of institutions and students. Since the revolution, these have grown from 91 higher educational institutions with 112,000 students in 1918 to about 900 institutions with some 1,100,000 full-time and 400,000 extension-course students at present. During this same period, the United States doubled the number of its institutions to 1,800, and increased the students fivefold to about 2,300,000.

The proportion of Soviet graduates in scientific fields over the past 20 years has varied between 70 percent of total graduates each year and the current figure of about 44 percent, while the proportion for the United States has remained close to 30 percent. (See chart #1, p. 17)

Quantitative measures of Soviet scientific and technical manpower are provided by comparing the numbers in the USSR and the United States in the following two groups:

- a. Graduates of higher educational institutions (colleges and universities) in scientific and technical fields. This includes persons with "first professional" degrees such as the M.D. and the D.D.S.
- b. Persons holding advanced degrees in scientific and technical fields; the Soviet Kandidat and the American Ph.D. (including the Sc.D.). In terms of formal requirements the Kandidat is the near equivalent of the Ph.D.

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Both of these groups have been broken down into three major subject categories -- physical sciences, agricultural sciences, and health sciences. (Chart #2 shows the fields which these categories include.)\*

The comparisons in charts #3 and #4 indicate that, in general size and composition, Soviet scientific and technical manpower is basically similar to that of the United States. The USSR has comparable numbers of graduates of higher educational institutions and holders of advanced degrees in each of the three major subject categories.

In chart #5 a comparison of the number of persons graduating annually in scientific and technical fields in the USSR and the United States is made. The number of Soviet graduates fell off in 1933 due to a lengthening of the courses of study, and the rapid rise around 1935 was the consequence of expanded enrollments from 1930-32. Both the Soviet and US curves show wartime losses and rapid postwar increases, which reached a peak in the United States in 1950 because of the "GI Bill." Since that time, the trend has favored the Soviet Union, and present Soviet plans call for continuing increases in the number of graduates.

The quality of Soviet scientific and technical manpower has been quite uneven. The first decade and a half of the Soviet period saw a general decline in the quality of scientific education until by the early thirties, after the rapid expansion of the First Five-Year Plan, standards of research and education had fallen to low levels. Beginning in 1933, however, Soviet leaders slowed the rate of increase in numbers of students entering scientific fields and enforced higher standards of work.

Present indications are that improving educational standards and increasing experience have raised the quality of Soviet scientific and technical personnel in most major fields to approach that of the United States. Recent Soviet efforts in the theory and application of science demonstrate a high degree of competence. Current graduates in science from higher educational institutions have completed about 15 years of intensive study with a generally far greater and more consistent emphasis on scientific subjects in secondary schools than is found in the United States. In general, only more-gifted and industrious students have survived the stiff competition to enter higher schools, although nepotism and political activity can be important considerations.

\* Unless otherwise apparent, the comparisons are for mid-1953. The estimates for the Soviet Union are believed accurate to within 10 percent.

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### TRAINING OF SOVIET SCIENTIFIC PERSONNEL

THOSE GRADUATING IN 1953 IN SCIENTIFIC FIELDS  
AS PERCENTAGES OF TOTAL

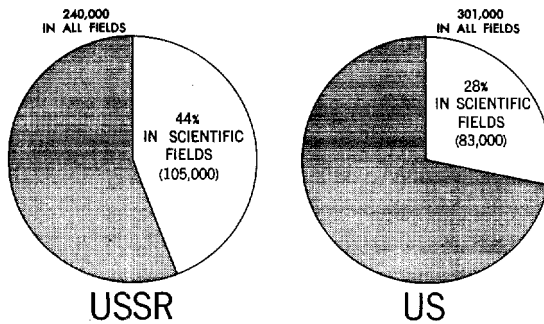


CHART 1

DEFINITIONS OF SUBJECT CATEGORIES

1. PHYSICAL SCIENCES INCLUDE:  
PHYSICS  
CHEMISTRY  
MATHEMATICS  
ENGINEERING  
GEOLOGY  
OTHER FIELDS BASED ON PHYSICS, CHEMISTRY OR THE EARTH SCIENCES
2. AGRICULTURAL SCIENCES INCLUDE:  
AGRICULTURE (AGRONOMY, ANIMAL HUSBANDRY, FORESTRY, ENTOMOLOGY, ETC.)  
BIOLOGICAL SCIENCES OTHER THAN THOSE INCLUDED UNDER "HEALTH SCIENCES"
3. HEALTH SCIENCES INCLUDE:  
MEDICINE AND MEDICAL SCIENCES  
DENTISTRY AND DENTAL SCIENCES  
OTHER FIELDS SUPPORTING HEALTH AND SANITATION (EXCLUDING NURSING UNLESS BASED ON 4-YEAR CURRICULA)  
BIOLOGICAL SCIENCES OTHER THAN THOSE INCLUDED UNDER "AGRICULTURAL SCIENCES"

CHART 2

NUMBERS OF GRADUATES EMPLOYED IN THE MAJOR  
SCIENTIFIC FIELDS

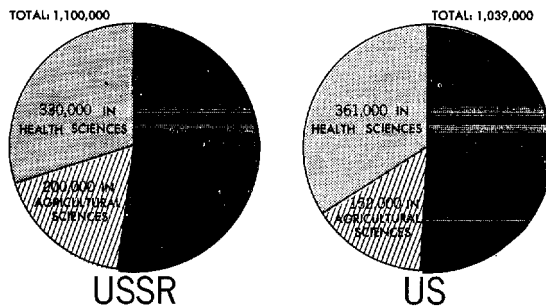


CHART 3

NUMBERS OF PERSONS HOLDING ADVANCED DEGREES  
IN SCIENTIFIC FIELDS

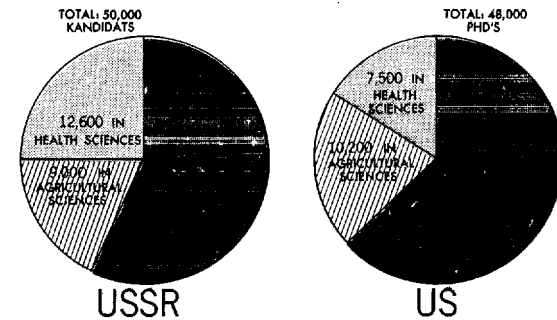
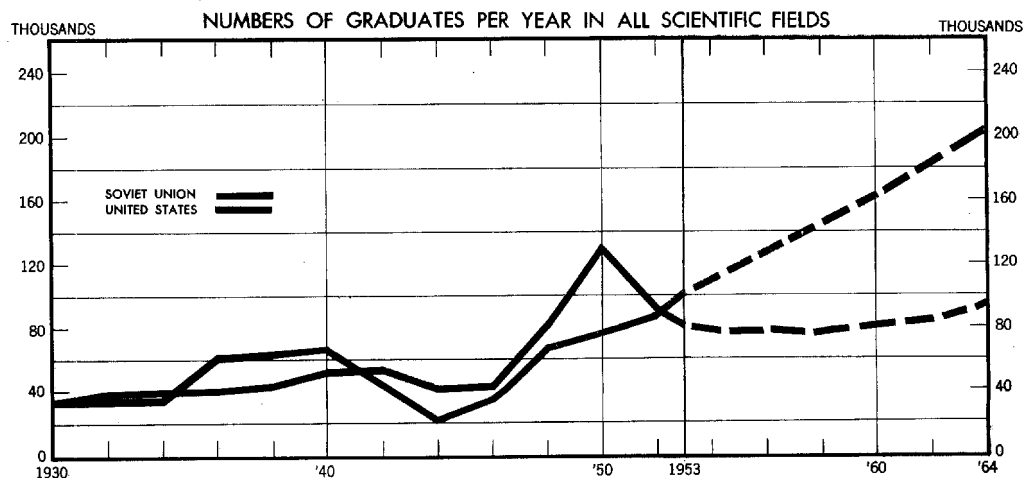


CHART 4



SPECIAL ARTICLE

THE LATEST LYSENKO AFFAIR  
(Secret)

The doctrine of T. D. Lysenko, dean of Soviet agricultural science and the official victor in the 1948 genetics controversy, has been brought under fire in the USSR in recent weeks. The Soviet leaders are calling for criticism of Lysenko, the popularizer of the view that acquired characteristics of plant and animal species can be transmitted through inheritance. They now appear aware that research work cast within this dogmatic context has failed to fulfill Lysenko's promises to raise agricultural productivity. The new regime is attempting to liberate Soviet agricultural scientists for more objective and possibly more fruitful inquiry. Nevertheless, the character of recent Soviet agricultural decisions suggests that Lysenko's views as a practical agronomist are still valued by the policy-makers.

The reputation of Lysenko, whose practical achievements were transformed into infallible Marxist theory under Stalin, is now being reduced to more realistic proportions. Not only have editorials called for a critical discussion of Lysenko's theories within the scientific community, but First Secretary Khrushchev personally rebuked Lysenko in late February for defending the agricultural official of the State Planning Committee who was blamed for the unplanned reduction of grain acreages in the USSR in recent years.

Although Lysenko's doctrine had been virtually unchallenged since the 1948 controversy in which he had Stalin's personal support, a few rumblings of protest from within the scientific community appeared in late 1952. The editor of the Botanical Journal attempted at that time to touch off debate on the validity of his theories, but the ensuing discussion was neither sustained nor penetrating. By contrast, the latest statements from fellow scientists have been unrestrained in their criticism. One described his defense of a controversial doctoral dissertation as "a mockery of Soviet science."

These attacks on Lysenko as a theoretician, however, have not been accompanied by a corresponding diminution of his authority as an applied scientist. On the contrary, the government has called on the Lenin Academy of Agricultural Sciences, which he heads, to join the agricultural ministries in drafting

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plans for the latest scheme for expansion of grain acreages. Even after criticism by First Secretary Khrushchev, Lysenko was re-elected to the Supreme Soviet, being carried on the official lists as second among the intellectuals only to the minister of culture. He was awarded the Order of Lenin in mid-February, less than two weeks before his official rebuke.

Subsequently, he broadcast recommendations on the tillage practices to be employed in the Kremlin's latest land expansion program. As recently as 14 April, he addressed a group of "authorized agents" dispatched by the Central Committee to newly created state farms.

In their present preoccupation with improving agricultural performance, the Soviet leaders appear inclined to rely heavily on scientific guidance. But their emphasis is on those forms of applied science which offer immediate returns in stimulating larger crop yields. As a dirt-farming practitioner concerned with such practical problems as raising the yields of potatoes and wheat, he was more acceptable to the Stalinist hierarchy than academic figures who dealt with abstract formulas.

To a new regime which faces the same problems and demands that scientists get closer to the soil, Lysenko, both by background and position, is strategically placed to supply advice. It is even possible that Lysenko may be partially responsible for the optimism of Soviet policy-makers about the prospects for expanding agricultural production and the reclamation of more than 30,000,000 acres of marginal land in the next two years. This possibility is suggested by the parallelism in the views of Lysenko and Khrushchev as revealed in the latter's speech on the hazardous land expansion effort. In explaining the necessity for bold measures, Khrushchev, echoing an argument which Lysenko had advanced as early as 1950, pointed out that the uncritical application of the crop rotation system had resulted in a reduction of Soviet grain acreages since 1940.

Only one day after Khrushchev's recommendation on land reclamation had been formalized in a decree, Lysenko broadcast a statement on practices which should be observed in cultivating virgin and waste land. In his discussion, he minimized the importance of the soil and climatic limitations which had defeated similar experiments in the 1930's and asserted that proper methods of cultivation were of "paramount importance" in achieving high yields in the marginal areas. This argument was presumably required to quiet the fears of Soviet officials that previous disastrous experiences would be repeated.

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in this latest program for stimulating agricultural production, the risks involved may be even greater than the Soviet leaders are themselves aware. Although he can measure some solid achievement in dealing with concrete agricultural problems, his claimed ability to improve agricultural production has frequently been far beyond his performance.